

Potentiostatic deposition of copper indium disulfide thin films: effect of cathodic potential on optical and photoelectrochemical properties

Abstract

CuInS₂ thin films were one-step potentiostatically deposited onto indium tin oxide (ITO) coated glass from aqueous solution containing CuCl₂, InCl₃ and Na₂S₂O₃. The effect of cathodic potentials on the structural, photoelectrochemical and optical properties of the deposited film were studied. X-ray diffraction (XRD) patterns showed that the deposited CuInS₂ material was polycrystalline with tetragonal structure. Photoactivity of the samples was studied using linear sweep voltammetry. A typical increase from 1.25 to 2.30 eV in the optical band gap energy was observed on increasing the cathodic potential from -0.30 to -0.70 V (Ag/AgCl).

Keyword: CuInS₂; Potentiostatic deposition; Cathodic potential; Photoactivity; Band gap